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Alaska National Interest Lands Conservation Act
Section 706(a), Report Number 10

PREFACE

Section 706(a) of the Alaska National Interest Lands Conservation Act (ANILCA) states that the Secretary of Agriculture will monitor timber supply and demand in Southeast Alaska and report annually on the ability of the Tongass National Forest to meet a timber supply rate of 4.5 billion board feet per decade as specified in Section 705¹. This report is submitted to the Committee of Energy and Natural Resources of the U.S. Senate and the Committee on Interior and Insular Affairs of the House of Representatives.

The report to follow describes the developments in the timber market during fiscal year 1990.² It is based on information gathered by the USDA Forest Service from federal agencies, published reports, trade journals, etc. This is the tenth such report prepared by the USDA Forest Service in consultation with the State of Alaska, affected Native corporations, the Alaskan timber industry, commercial fishing interests and the Southeast Alaska Conservation Council in accordance with Section 706(c) of ANILCA. Comments on the report were solicited from the ANILCA cooperators and other industry experts, consultants and researchers.

As in previous years, this report includes references to the forest resources and timber industry's activities in Southcentral Alaska. Although the Southcentral region exhibits the potential for an enlarged role in the Pacific Rim marketplace, initial attempts at large scale operations have suffered financial difficulties. At present the Southcentral timber industry is considerably smaller than that of Southeast and its future remains uncertain.

- 1 The current Tongass Land Management Plan (TLMP) specifies an ASQ of 4.5 billion board feet per decade. Changes to this ASQ are being considered as part of the on-going TLMP Revision.
- 2 The 1990 federal fiscal year began October 1, 1989, extending through September 30, 1990. The Tongass Timber Reform Act (Public Law 101-626) was passed on November 28, 1990 (prior to publication of this report) and has significant implications for the long-term contracts and timber management on the Tongass. In particular, the requirement to meet a timber supply rate of 4.5 billion feet per decade in Section 705 was replaced with a requirement to "provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the market demand from such forest for each planning cycle". Because this report is intended to be a review of the FY 1990 timber market, the implication of this legislation has not been addressed. The scope of the next supply and demand report will include any changes in the supply and demand situation related to the new act.

EXECUTIVE SUMMARY

Tongass National Forest Harvest Reaches Decade High

Timber harvest on the Tongass National Forest reached a decade high of 471 million board feet in fiscal year 1990 (October 1, 1989 - September 30, 1990). Of this total, some 48 percent was used in the production of lumber and cants, 39 percent in pulp production, and the balance consisted of cedar exports. Stumpage prices for Tongass timber sales also hit a record high of \$120.9 per thousand board feet, more than a four fold increase over a two-year span. Timber sale operators responded by accelerating the harvest of volume under contract, dropping the level of timber sales under the short-term sale program to one-fourth that of fiscal year 1989.

At 1.09 billion board feet, the total timber harvest in Southeast Alaska was only slightly below the banner harvest level of fiscal year 1989. Timber harvested on National Forest lands accounted for 43 percent of the total while the volume removed from private lands accounted for 56 percent. Approximately 93 percent of the estimated 614 million board feet harvested on private lands was exported in the round.

Strong Export Market for Alaskan Wood Products

With respect to market conditions over the last ten years, fiscal year 1990 was an outstanding year for the Alaskan forest products industry. The average value of log exports increased 17 percent over fiscal year 1989, reaching a decade high of \$578 per thousand board feet. The increased price more than compensated for a slight reduction in trade volume and boosted the total dollar value of log exports from Alaska to over \$350 million. The total value of exported lumber and cants increased to \$85.3 million, driven by a 24 percent increase over the volume exported in fiscal year 1989. The volume of Alaskan pulp exports remained close to the record high of fiscal year 1989, although an 8 percent price drop reduced the total dollar value to \$203 million.

Timber Industry Employment Continues to Grow

A major objective of the Alaska National Interest Lands Conservation Act (ANILCA) was to maintain timber supply availability for the Southeast Alaska timber industry, thereby stabilizing employment in local communities and diversifying the region's economic base. To a large extent, the employment objective was met again in fiscal year 1990. Logging, sawmill, and pulpmill employment reached a peak of 3543 jobs, a 30 percent increase relative to fiscal year 1981. Economic linkages with other industries supported an additional 2570 jobs. Because of the mandate to process National Forest timber within Alaska, most of the 1399 jobs provided by sawmills and pulpmills are linked to timber supplies from the Tongass.

Japan Dominates Market for Alaskan Timber

Japan remained the primary destination for Alaskan wood products, and accounted for over 64 percent of the total export value of wood-based commodities in fiscal year 1990. The uncommonly high level of economic activity in Japan and favorable yen/dollar exchange ratio throughout fiscal year 1990 kept demand for Alaskan wood products high. Approximately 97% of Alaska's lumber and cant exports were shipped to Japan along with 37% of the exported pulp and 72% of the exported logs (Figure 1).

Figure 1.
Japanese Demand is a Key Factor in the Market for Alaskan Wood Products

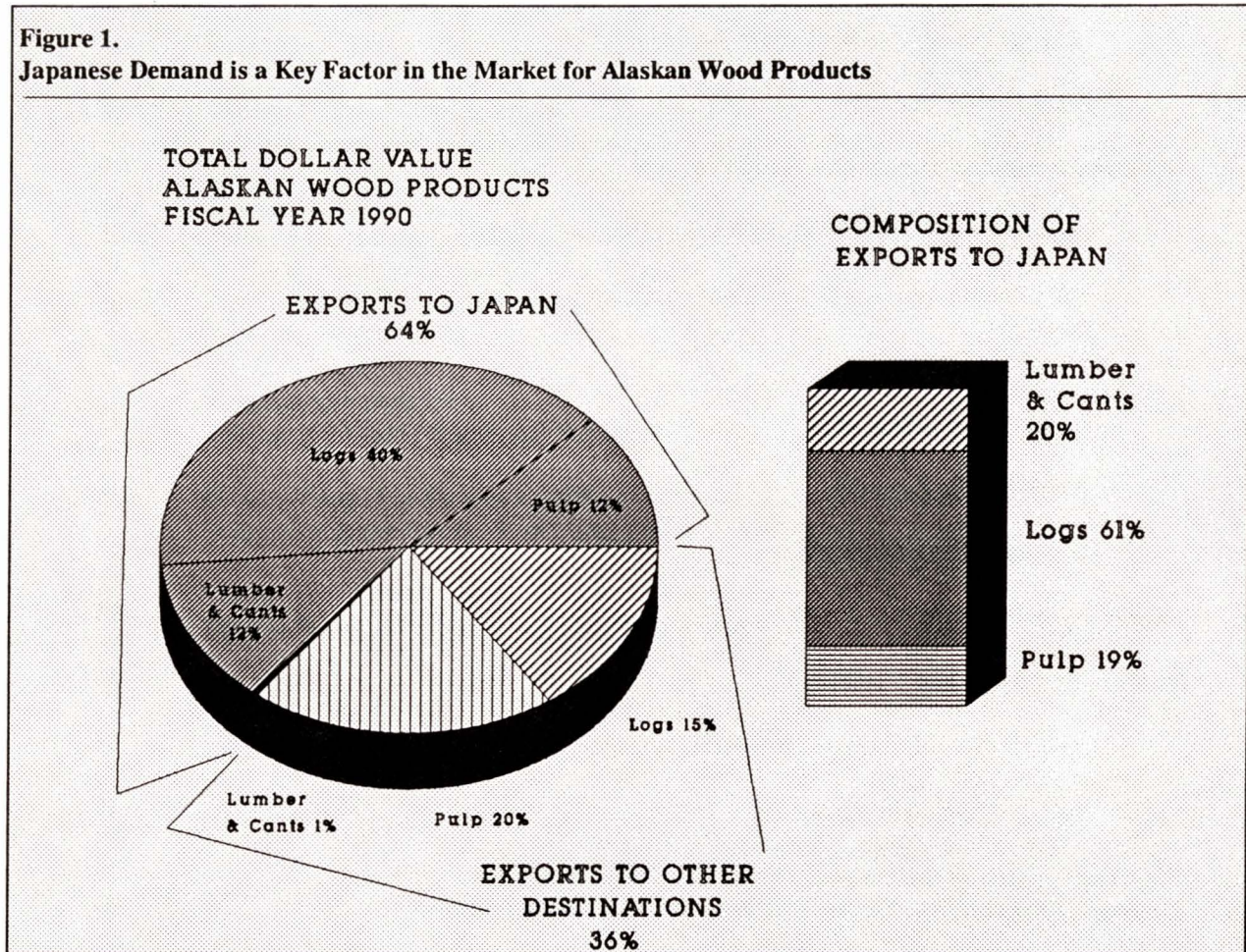


Table of Contents

Preface	iii
Executive Summary	iv
Introduction	1
Timber Supply	3
National Forest Contributions to Timber Supply	3
Total Timber Harvest	3
Demand For Alaskan Timber and Wood Products	6
Importance of Export Trade to Alaskan Economy	6
The 1990 Market for Alaskan Wood Products	7
Five-Year Trends	10
Japan, Major Destination	11
South Korean Potential	12
Demand and Timber Quality	12
Market Dynamics	13
Timber and the Alaskan Economy	15
Employment in the Wood Products Industry	15
Pulp Production in Alaska	17
Financial Analysis of the Tongass Timber Sale Program and the Economic Impacts of the Timber Sale Program on Southeast Alaska	18
References	23

List Of Tables

Table 1.	Volume of Timber Offered, Sold and Harvested Tongass National Forest, Fiscal Years 1988-90	3
Table 2.	Timber Supply in Southeast and Southcentral Alaska Harvest and Import by Source and Type of Timber Fiscal Years 1982-1990	4
Table 3.	International Exports of Alaskan Wood Products Fiscal Years 1981-1990	9
Table 4.	Alaskan Log and Lumber Exports Value by Destination and Fiscal Year	11
Table 5.	Alaskan Pulp Exports Value by Destination and Fiscal Year	11
Table 6.	Employment in the Wood Products Industry of Southeast Alaska Fiscal Years 1981-1990	15
Table 7.	Revenues and Expenses Tongass National Forest, Fiscal Years 1989 and 1990	20
Table 8.	Present Value of Investments and Future Benefits Tongass National Forest, Fiscal Years 1989 and 1990	21
Table 9.	Employment, Income, and Physical Accomplishments Tongass National Forest, Fiscal Years 1989 and 1990	22

List of Figures

Figure 1.	Japanese Demand is a Key Factor in the Market for Alaskan Wood Products	v
Figure 2.	Stumpage Prices for National Forest Timber Sold in Alaska	5
Figure 3.	Value of Alaskan Exports in 1990	6
Figure 4.	International Export of Alaskan Wood Products by Primary Destination	7
Figure 5.	International Export of Alaskan Softwood Logs	7
Figure 6.	International Export of Alaskan Lumber and Cants	8
Figure 7.	International Export of Alaskan Pulp	8
Figure 8.	Quarterly Average Prices of Exported Alaskan Logs and Lumber	10
Figure 9.	Quarterly Average Prices of Exported Alaskan Pulp	10
Figure 10.	Total Employment Estimates National Forest vs. Export-Oriented Harvest	16
Figure 11.	Timber Harvest and Logging Employment Southeast Alaska 1981-1990	16

INTRODUCTION

Covering 16.9 million acres, the Tongass is the largest Forest in the National Forest System and contains an important share of the nation's renewable and nonrenewable natural resources. Planning and on-going management of the Tongass present challenges of equal scale and complexity. As part of its mission, the Forest Service administers programs of timber management and forest renewal intended to further the national objective of ecosystem sustainability while providing commodity resources that stabilize employment and income in local communities. Timber harvest in Southeast Alaska dates back to the early 1900's, and the wood products industry is well-integrated into the economies and lifestyles of many communities. Over the years, the timber industry has survived the fluctuations of a cyclical market, expanded international exports to include some thirty nations, and employed technological advances to maintain market share in the face of increased competition.

The sections to follow continue a ten-year series of reports documenting the role of the Tongass National Forest in the Alaskan wood products industry. First, the significance of the Tongass as a supply source for the wood products industry is examined. Second, timber and wood products flows and values for FY 1990 are presented, along with a discussion of the primary sources of demand for Alaskan wood-based commodities. Finally, the influence of the timber industry on the socioeconomic structure of Alaskan communities is discussed.

TIMBER SUPPLY

National Forest Contributions to Timber Supply

The Forest Service offered 334 million board feet (MMBF) for sale in Alaska during fiscal year (FY) 1990. This is 4 percent more than the volume offered in FY 1989. National forest timber harvest in fiscal year 1990 increased by 6 percent over 1989. Timber sale operators harvested 399 MMBF of sawtimber and 72 MMBF of utility grade logs, to result in a decade high harvest volume of 471 MMBF. Of this total, some 48 percent was used as sawlogs, 39 percent as pulp logs, and the remaining 13 percent was exported.

The FY 1990 short-term sale program on the Tongass demonstrated a fairly typical response to a rapid increase in stumpage prices. The volume sold was only 25 percent of the previous year's sales, dropping to a ten-year low of 22.7 MMBF. The volume harvested, however, reached a high of 149 MMBF. The difference came from the harvest of timber under contract, reducing timber backlog to the lowest point in a decade (Table 1). The volume offered under the short-term sale program was 40 percent less than that of FY 1989.

The volume offered under the two remaining long-term sales increased by 19 percent to 287 MMBF. Harvest under the long-term sales remained at the previous year's level of about 250 MMBF.

Total Timber Harvest

The total volume of timber harvested in the State of Alaska dropped by 2 percent in FY 1990, reversing the trend of increased harvest observed since 1985 (Table 2). Total timber harvest in Southeast Alaska was 992.2 MMBF while harvest in Southcentral Alaska was 107.1 MMBF.

Private timber harvest (including that of the Southeast Alaska Native corporations organized under the Alaska Native Claims Settlement Act) fell by 5 percent in comparison with last fiscal year and accounted for 56 percent of the total harvest. The sawlog harvest from private timberlands in Alaska was approximately 547 MMBF and the pulp log harvest roughly 67 MMBF. Of this total, some 93 percent was exported and the remaining 7 percent was used as pulp logs.

**Table 1. Volume of Timber Offered, Sold and Harvested
on the Tongass National Forest, Fiscal Years 1988-90
(all volumes in MMBF, net sawtimber)**

	1988	1989	1990
Short-Term Sales			
Volume Offered	82	79	47
Volume Sold	62	82	23
Volume Harvested	83	126	149
Long-Term Sales			
Volume Offered (Prepared)	255	242	287
Volume Sold (Released)	234	172	263
Volume Harvested	249	251	250
Total Volume Offered	331	321	334
Total Volume Sold	296	254	286
Total Volume Harvested	332	377	399

Note: The activities related to the long-term contracts are somewhat different than those of the short-term sale program. The following clarifications are provided in reference to the figures reported above.

Volume Offered- Under the short-term contracts, this refers to advertised volume. The volume fully prepared and available is reported here as a comparable measure for the long-term contracts.

Volume Sold- Under the short-term contracts, this refers to the volume awarded to purchasers. The volume formally released to contract holders is reported here as a comparable measure for the long-term contracts.

*Table 2. Timber Supply in Southeast and Southcentral Alaska
Harvest and Import by Source and Type of Timber, Fiscal Years 1982-1990 1/*

	1982	1983	1984	1985	1986	1987	1988	1989	1990
(In million board feet, log scale)									
Southeast									
Public									
Tongass N.F.									
Sawtimber	326.6	220.0	226.7	162.5	251.4	282.0	331.5	377.0	399.0
Utility ^{2/}	43.8	30.0	34.0	69.5	39.1	54.2	64.7	67.6	72.0
State of Alaska ^{3/}									
Sawtimber	30.1	21.8	16.9	4.2	12.2	19.5	16.8	11.4	11.1
Utility	0.0	0.1	0.5	0.5	0.2	0.3	0.0	0.1	1.0
BIA	2.8	3.1	1.1	0.1	0.0	0.0	0.0	3.5	0.0
Private^{4/}									
Export Sawlogs	137.0	249.3	202.3	225.3	295.9	286.1	286.4	419.8	441.7
Pulplogs	19.6	54.3	88.0	61.0	58.8	124.8	121.3	109.9	67.4
SE AK Sawlog Harvest	496.5	494.2	447.0	392.1	559.5	587.6	633.2	811.7	851.8
SE AK Total Harvest	559.8	578.6	569.5	523.1	657.7	766.9	819.3	989.2	992.2
Imports									
Sawlogs	3.1	21.1	5.7	7.8	24.4	5.7	0.1	1.8	1.2
Pulpwood logs	0.0	2.0	38.0	11.9	22.1	5.1	6.8	1.9	0.0
Wood chips ^{5/}	0.0	0.0	15.6	0.0	0.0	0.0	0.0	0.0	0.0
SE AK Wood Supply	562.9	601.7	628.8	542.8	704.2	777.7	826.2	992.9	993.4
Southcentral									
Public									
Chugach N.F.	0.4	1.1	0.5	0.7	0.8	0.7	1.0	1.1	1.0
State of Alaska									
Sawtimber	1.4	0.8	0.8	0.5	1.0	1.1	0.5	0.5	0.4
Utility	0.8	27.8	2.3	1.8	0.8	0.8	1.6	1.6	0.6
Private									
Export Sawlogs	21.2	ne	ne	ne	ne	44.2	79.2	120.0	105.1
Pulplogs	ne	ne	ne	ne	ne	0	6.4	0.0	0.0
Southeast and Southcentral Alaska									
Harvest Sawtimber	519.5	496.1	448.3	393.3	561.3	633.6	713.9	932.4	958.3
Harvest Total	583.6	608.3	573.1	526.1	660.3	813.7	908.0	1112.4	1099.3
Wood Supply	586.7	631.4	632.4	545.8	707.3	824.5	914.9	1116.1	1100.5

1/ The Federal Fiscal Year extends from October 1st to September 30th of the following year.

2/ The Forest Service requires the harvest and removal of utility volume which is in addition to the 450 MMBF Allowable Sale Quantity (ASQ) calculated in the Tongass Land Management Plan (TLMP). The ASQ is based on net sawlog volume.

3/ Based on new information, State harvest totals have been updated for all years. The adjusted figures reported here supersede the figures displayed in previous year's reports.

4/ Estimate. Sources were not found for certain years or ownerships and are not estimated (ne). Some of the private harvest reported in fiscal years 1982-86 for southeast Alaska originated from southcentral Alaska, but data were not available to separate the two regions from the estimated total.

5/ Compiled from official statistics of the U.S. Department of Commerce. Commerce reports pulpwood imports and wood chips imports in short tons. Cords are converted to log scale at a ratio of 2 cords per thousand board feet(MBF). Wood chips are converted to log scale at a ratio of 2.7 short tons per MBF.

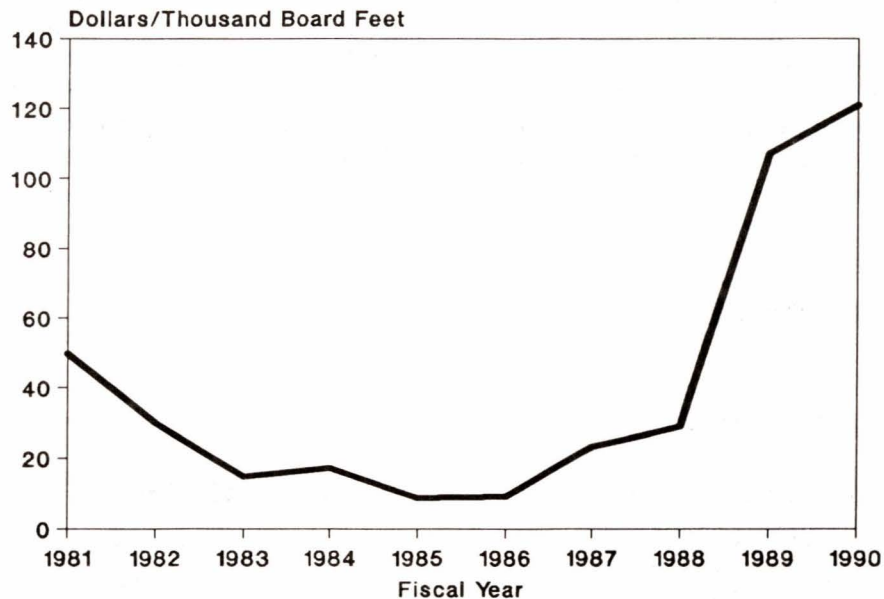
Harvest from other public lands (both federal and State) remained at 13 MMBF. The bulk of this timber is used as pulp logs.

There are four sources of timber for processors in Southeast Alaska: The Tongass National Forest, private timberlands, other government timberlands, and timber (and chip) imports (Table 2). The largest volume of the timber harvested in Southeast Alaska goes into the export market as logs, while the second largest use is for pulp. The sawlog market is the third largest market. Federal timber is used to make dimension lumber and dissolving pulp. A small volume (about 60 million board feet in FY 1990) of federal timber, mostly western red cedar and Alaskan yellow cedar, is sold as log exports. Timber from

private timberlands is exported as logs or sold to the local pulp mills.

Finally, stumpage prices for National Forest sales (all convertible products but excluding long-term sales) in Alaska continued to rise in FY 1990 reaching their highest level in more than a decade (Figure 2). A contributing factor was the general increase in stumpage prices in the Pacific Northwest during the spring and early summer of 1990. These increases were attributed to supply restrictions associated with new plans for some of the National Forests in the Pacific Northwest along with numerous attempts to define and implement a conservation strategy for the Northern spotted owl, discussed later.

Figure 2.
Stumpage Prices for National Forest Timber Sold in Alaska



DEMAND FOR ALASKAN TIMBER AND WOOD PRODUCTS

Importance of Export Trade to Alaskan Economy

The abundance of natural resources and minimal industrial development in Alaska contribute to a reliance on export trade for the State's larger industries. Alaska exports a larger share of its total production relative to the United States as a whole. In 1986, the dollar value of the total output of goods in services in Alaska was \$19.6 billion¹. Commodity exports represented 6.6 percent, or \$1.3 billion. In comparison, commodity exports represented 5.4 percent of the total United States production. It is important to note that Alaska is even more reliant upon dollars from outside the State than these figures would suggest. The sale of North Slope oil to the rest of the United States and income accruing from both international and domestic tourism activity are significant trade components as well.

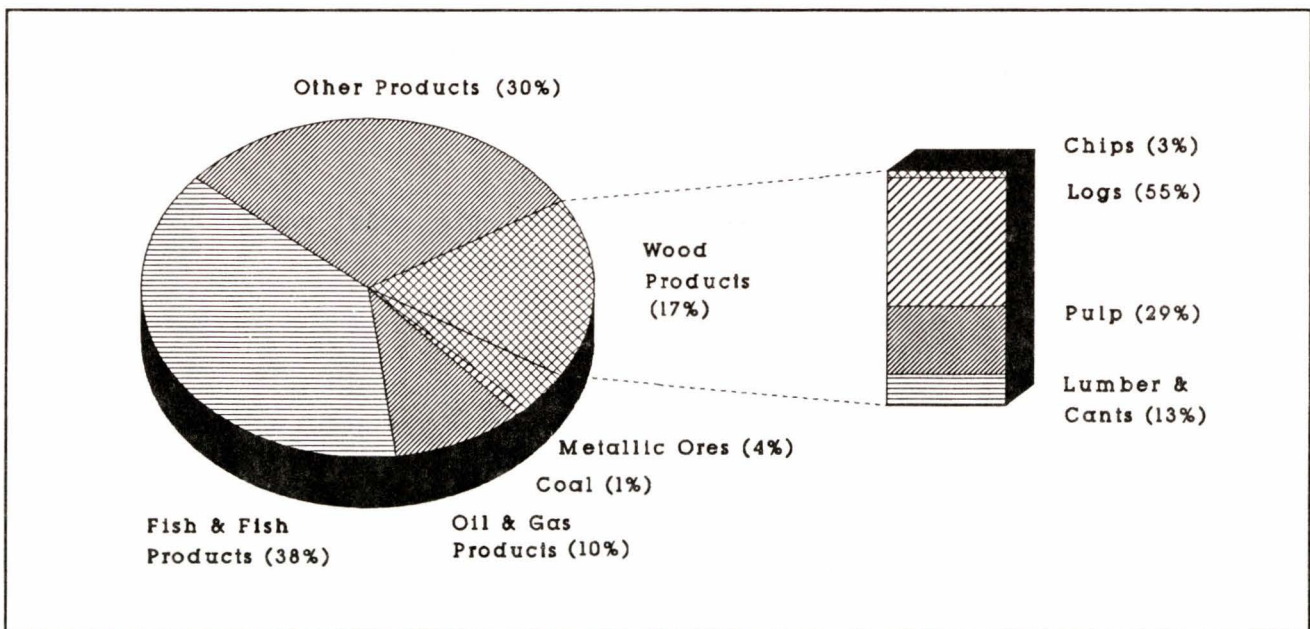
The value of international exports from Alaska exceeded \$3.3 billion in 1990. The greatest dollar value of international trade was generated from the export of fish and fish products (38%) followed by wood products

(17%), oil and gas (10%), metallic ores (4%), and coal (1%) (Figure 3).

Alaska plays a significant, although far from dominant, role in world markets for wood products. Exclusive of Canada-United States trade, Alaska accounts for about six percent of the softwood logs moving into Pacific Rim markets (Haynes and Brooks 1990), and about five percent of the softwood lumber. Both percentages have been static for several years, with exports of Alaskan logs and lumber keeping pace with (roughly) a 25-percent increase in Pacific Rim supply and consumption. The market for Alaska's dissolving pulp is global and represents about 22 percent of the export trade to major consuming countries, including states in the Lower 48 (Haynes and Brooks 1990).

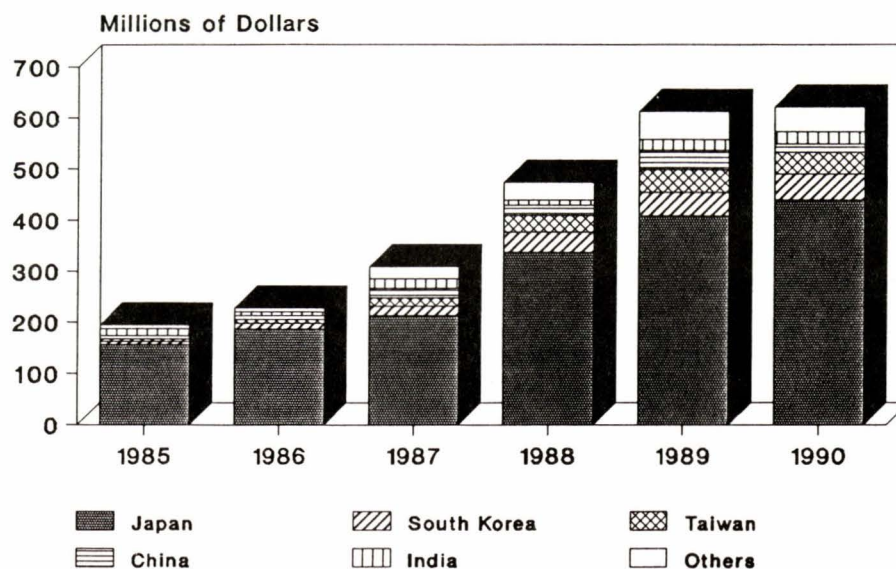
Overall, most of Alaskan pulp production and virtually all of the lumber manufactured go overseas, with some thirty nations represented among the purchasers (Figure 4). National Forest logs provide most of the basis for these flows, as private logs move largely into offshore markets as roundwood.

Figure 3.
Value of Alaskan Exports in 1990 (Percent Distribution)



1 The gross market value of the goods and services attributable to labor and property located in a state is referred to as Gross State Product (GSP). Annual estimates of GSP for each state are reported by the Bureau of Economic Analysis (BEA). As more recent data has not yet been released by BEA, the 1986 estimates were used in this report.

Figure 4.
International Export of Alaskan Wood Products by Primary Destination



The 1990 Market for Alaskan Wood Products

FY 1990 was a time of relatively strong demand for Alaskan wood products, despite a leveling in the growth rate of construction activity in Japan and the lowest activity in U.S. housing since the deep recession of 1982. Although log exports dropped by 4 percent, total volume

still exceeded 600 million board feet; more than a four-fold increase in a ten-year span (Figure 5). Total exports of lumber and cants from Alaska in 1990 reached a decade high of 225 million board feet, about a 25-percent increase relative to 1989 (Figure 6). The market for pulp, however, was not as strong and the volume exported dropped by nearly 15 percent (Figure 7).

Figure 5.
International Export of Alaskan Softwood Logs

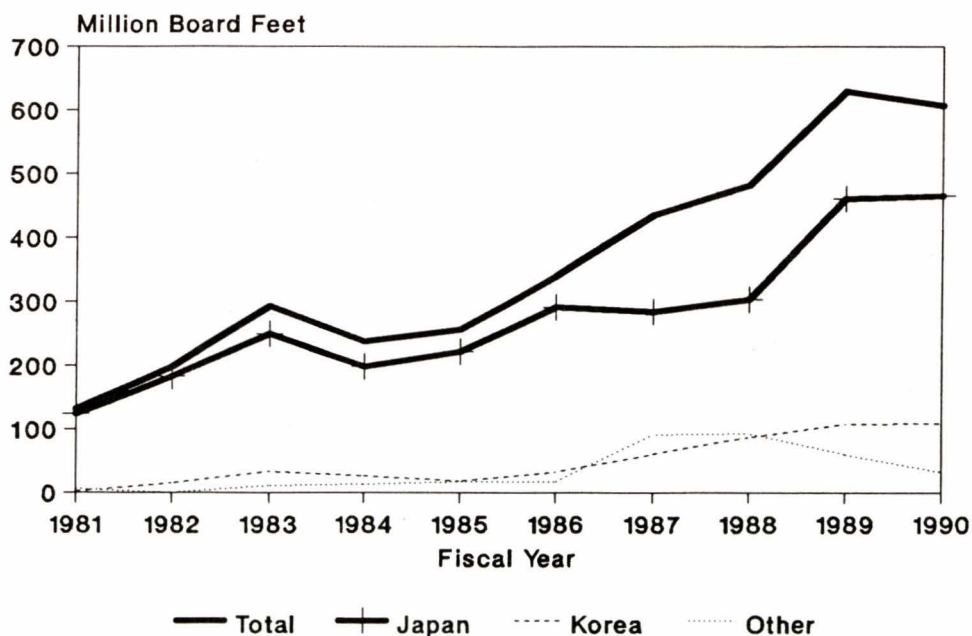


Figure 6.
International Export of Alaskan Lumber and Cants

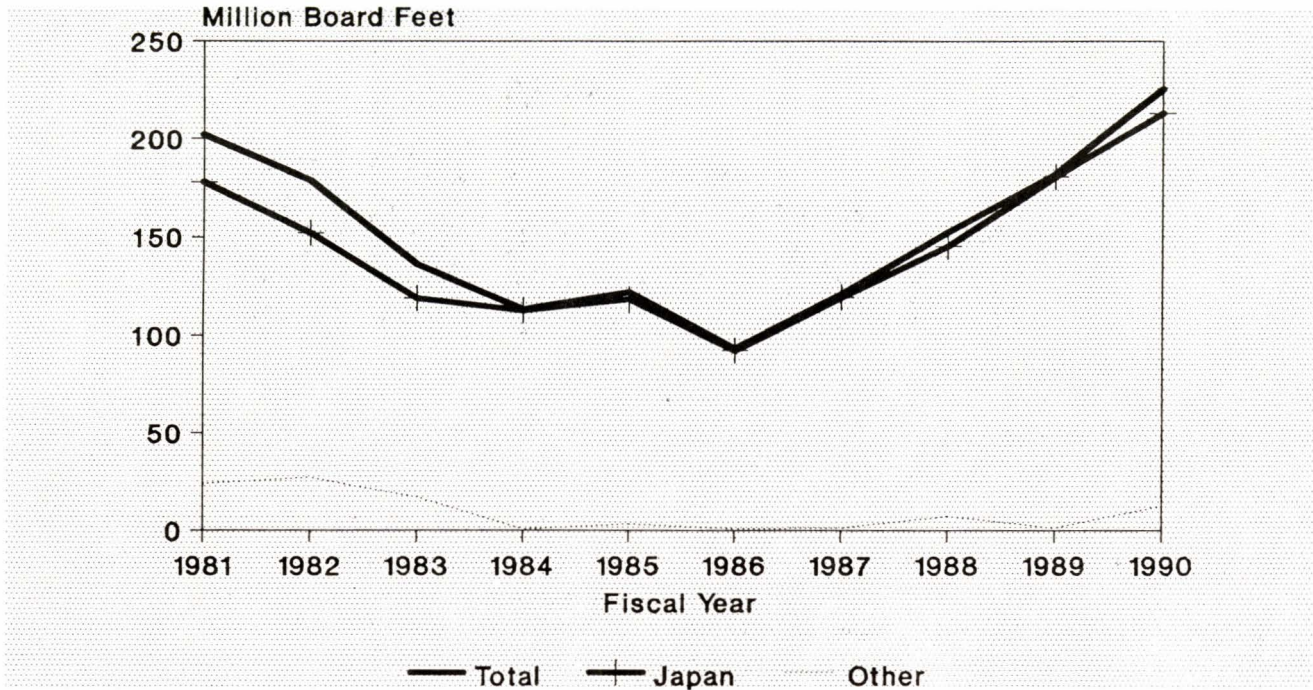
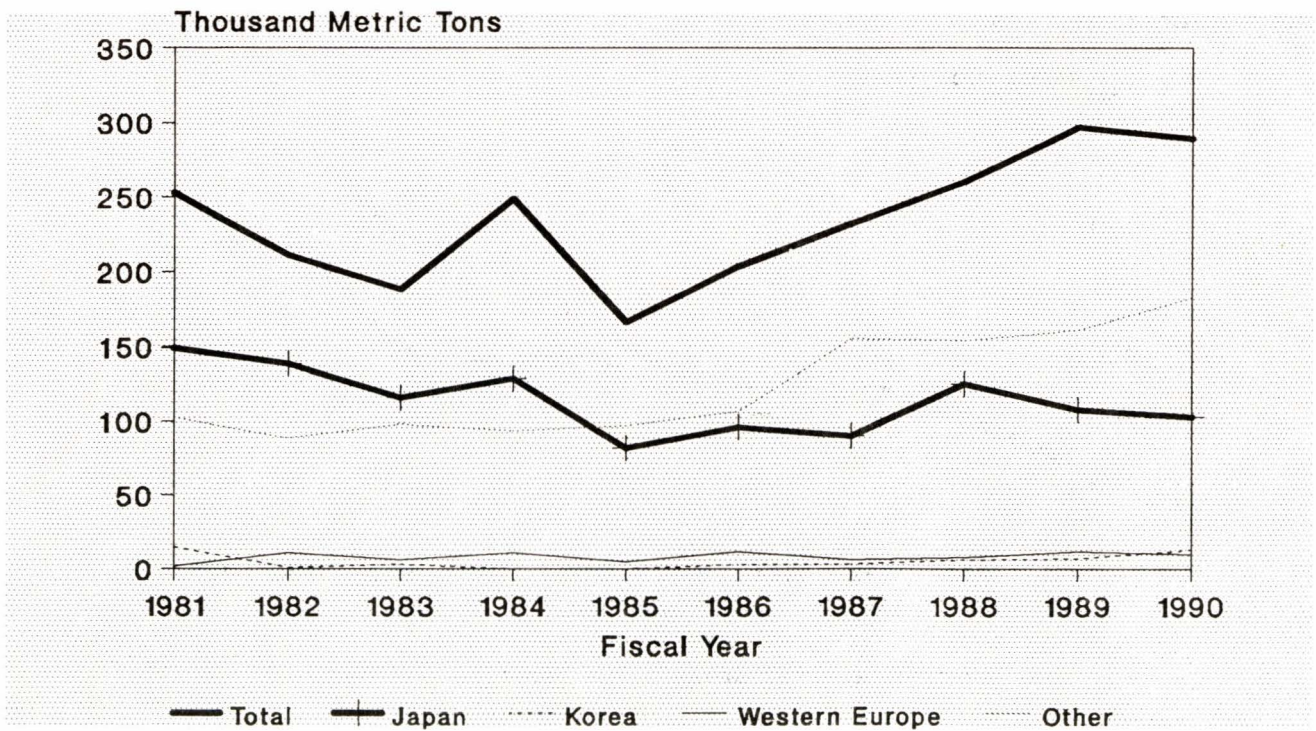


Figure 7.
International Export of Alaskan Pulp



The combined value of all exported Alaskan wood products was over 600 million dollars for the 1990 fiscal year. At \$578 per thousand board feet (log scale), the average value of Alaskan softwood log exports was 17 percent above 1989 prices. Export values for lumber and cants remained strong at \$378 per thousand board feet (lumber tally), dropping only 3 percent from the record prices of 1989. The value of exported pulp dropped 5 percent from 1989 prices to an average of \$703 per metric ton for the fiscal year (Table 3).

Following a period of decline at the start of the year, prices for exported Alaskan lumber increased during the fourth quarter of FY 1990. The increase presumably reflected the rising value of the yen and scarcity factors in North America. Average prices of exported Alaskan logs increased throughout most of the fiscal year but fell slightly in the last quarter; the drift downward corresponding to an overall reduction in economic activity. Log prices rose by about ten percent early in the year and then receded by about five percent.

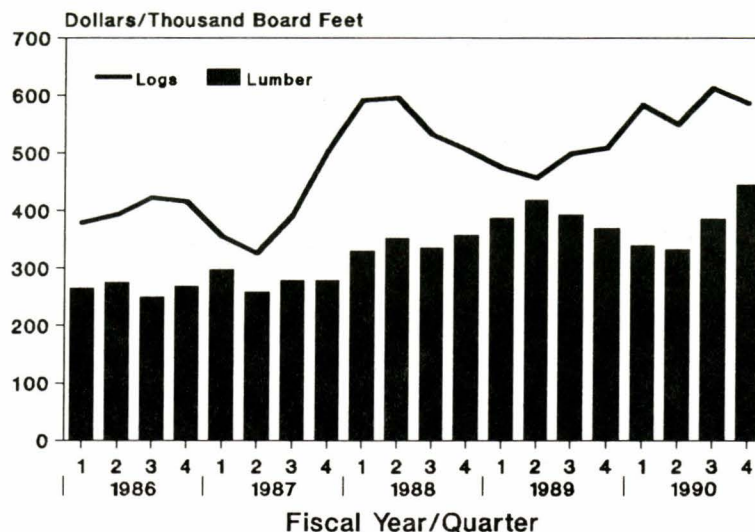
Table 3. International Exports of Alaskan Wood Products Fiscal Years 1981-1990

Product/Unit ¹	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Softwood Logs										
Volume (MMBF)	130.1	197.5	292.6	237.6	258.6	340.3	436.1	482.2	629.6	606.6
Value (\$millions)	68.4	95.4	128.3	97.1	99.6	137.9	179.6	261.6	310.3	350.9
Unit Value (\$/MBF)	526	483	439	408	385	405	412	543	493	578
Lumber and Cants										
Volume (MMBF)	202.5	178.6	136.0	113.3	122.0	93.5	121.0	152.5	182.3	225.5
Value (\$millions)	60.3	62.5	45.5	32.2	32.5	24.7	33.9	52.1	71.0	85.3
Unit Value \$/MBF	298	350	334	284	266	264	280	342	389	378
Woodchips										
Volume (Mton)	60.5	84.8	19.0	10.5	4.5	0	0	10.4	77.9	18.2
Value (\$millions)	5.5	6.4	1.3	.3	.4	0	0	.6	3.6	1.4
Unit Value (\$/ton)	90	75	66	32	98	0	0	54	46	78
Woodpulp										
Volume (Mton)	252.9	211.0	188.5	249.2	166.5	203.8	232.0	260.4	296.9	289.3
Value (\$millions)	135.7	113.3	94.8	127.3	72.0	85.4	113.9	160.4	227.7	203.4
Unit Value (\$/ton)	537	601	503	510	433	419	492	616	767	703
TOTAL VALUE (\$millions)	269.9	277.6	269.9	256.9	204.5	248.0	327.4	474.7	612.7	641

¹ Volumes exported are reported as millions of board feet (MMBF) or thousands of metric tons (Mton). Values are free along ship (FAS) in millions of nominal dollars. Unit values are dollars per unit.

Source: Compiled from official statistics of the U.S. Department of Commerce (1990).

Figure 8.
Quarterly Average Prices of Exported Alaskan Logs and Lumber

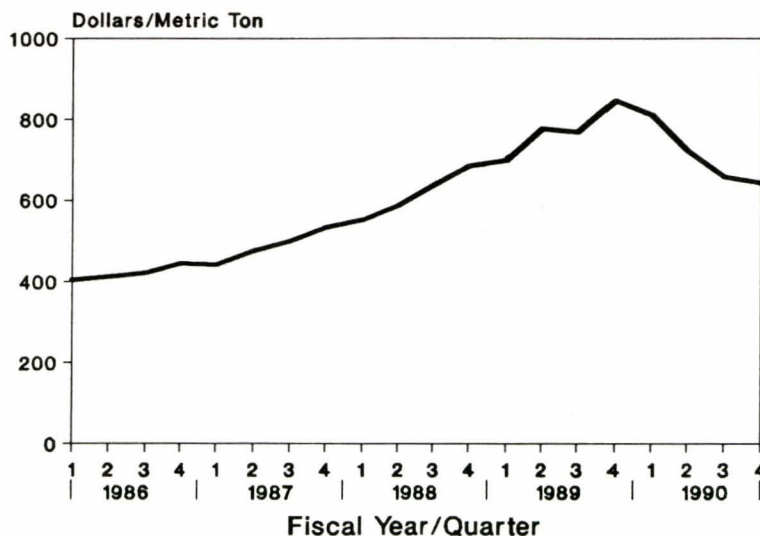


Five-Year Trends

Figure 8 tracks quarterly price averages for exported Alaskan logs and lumber, since 1986. The upward trend, about 50 percent for logs and about 40 percent for lumber over the period, substantially exceeded the average rate of inflation-based price increases for other U.S. producer goods. During these five years on the uphill side of an economic cycle, solid-wood products became more valuable in Alaska and more costly to offshore purchasers, at least in terms of U.S. dollars.

The average price of dissolving-grade pulp leaving Alaska increased by about half over the five-year span (Figure 9). The increase is attributable to growing demand for rayon and acetate fabrics and for paper-grade pulps (Durback, USDA Forest Service 1989). The former change presumably reflected changing consumer tastes in clothing materials as well as rising consumer affluence; the latter trend coincided with an upward economic cycle.

Figure 9.
Quarterly Average Prices of Exported Alaskan Pulp



Japan, Major Destination

Japan remains the principal customer for Alaskan wood products. As shown in Table 4, 72 percent of logs and 95 percent of lumber exports were purchased by Japan in FY 1990. The Japanese share of pulp exports was 38 percent; this was the largest single foreign destination (Table 5).

**Table 4. Alaskan Log and Lumber Exports
Value by Destination and Fiscal Year
(Thousands of dollars)**

	1986	1987	1988	1989	1990
Softwood Logs:					
Australia	0	0	0	35	150
Canada	1,707	1,564	9,840	9,313	8,625
China	745	0	3,775	3,229	3,735
Germany	0	0	0	17	0
Israel	0	0	37	0	0
Japan	91,415	126,466	148,874	211,393	252,323
South Korea	5,778	9,613	16,595	33,833	41,315
Taiwan	0	293	529	3,778	4,335
Turkey	0	0	0	246	0
World	137,935	179,645	261,643	310,348	350,873
Lumber and Cants:					
Japan	24,290	33,506	48,385	70,309	80,178
South Korea	315	61	2,754	559	732
World	24,657	33,704	52,116	70,985	82,898

Source: Compiled from official statistics of the U.S. Department of Commerce.

General economic activity was uncommonly high in Japan during FY 1990. Gross national product was 5-1/2 percent above the previous year. Industrial production rose 2 percent, to the highest level since World War II.

For the year as a whole, housing starts in Japan were at the third highest level in the nation's history in 1990, exceeding the U.S. level by half. However, the Japanese rate was peaking, with the all-year rate 2.7 percent above 1989's, while the first six months were more than four percent above the same period of 1989. By late 1990, the world recession was being felt, with housing starts several percentage points below late 1989.

**Table 5. Alaskan Pulp Exports
Value by Destination and Fiscal Year
(Thousands of dollars)**

	1986	1987	1988	1989	1990
Argentina	1,326	1,239	1,341	0	0
Austria	0	103	0	0	0
Bangladesh	0	795	0	0	845
Belgium/ Luxemburg	1,725	2,032	1,198	4,307	2,479
Bulgaria	531	246	0	0	0
Canada	0	0	354	0	68
China	7,572	14,436	16,842	33,929	18,928
Czechoslovakia	0	0	47	302	3,790
Egypt	5,343	3,122	5,621	7,563	11,216
France	0	0	0	377	200
Germany	1,610	931	2,171	3,276	3,122
Hong Kong	0	372	0	0	0
Hungary	0	0	0	38	0
India	6,837	18,401	9,043	21,192	25,214
Indonesia	1,500	3,500	2,433	1,998	6,366
Japan	42,677	45,340	77,010	82,079	76,686
Netherlands	117	112	0	0	0
Poland	0	1,394	4,294	6,780	4,279
South Korea	1,103	1,418	3,282	4,684	7,061
Soviet Union	3,271	4,015	5,247	10,472	7,186
Spain	1,571	0	1,271	773	1,034
Switzerland	0	0	0	9	0
Taiwan	8,180	16,946	28,880	40,237	32,439
Thailand	2,210	1,912	2,579	5,859	2,320
Turkey	0	0	0	0	25
United Kingdom	0	0	0	73	133
World	85,363	113,924	160,397	227,713	203,391

Note: Alaskan pulp is also shipped to buyers in the Lower 48 states. Traditionally, this market has accounted for 5-10% of total production.

Source: Official statistics, U.S. Dept. of Commerce

The value of the yen, relative to the U.S. dollar, changed markedly during FY 1990, first falling and then rising. The changes added to the instability of markets and uncertainty for Alaskan sellers. The yen declined about 12 percent during the first six months of FY 1990, followed by a rise of about 23 percent. These changes contributed to a rise in yen prices of North American lumber, followed by a slight decline. However, the price movements coincided with a buildup and decline in log inventories in Japan, so the specific importance of currency values cannot be deduced clearly.

South Korean Potential

South Korea is becoming an important customer for Alaskan roundwood. In FY 1990, 18 percent of Alaskan log exports were bound for South Korea. The volume increased by 3-1/2 times relative to FY 1986.

The diversity of South Korea's wood quality needs is similar to the range of Alaskan offerings. Like Japan, South Korea produces pianos and other goods using Alaska's high-quality spruce (Kim and others [in press]). At the other end of the spectrum, South Korea is well-known for its imports of low-grade softwoods, exemplified by "K-sort" logs from the Pacific Northwest and packaging-grade radiata pine from Chile. Whether South Korean interest will shift to lumber as (exportable) private log supplies diminish in Alaska, is not yet clear.

South Korea's economy grew by 9 percent in 1990, one of the world's fastest growth rates, suggesting sustained strong demand for softwood products. Over the course of a single generation, South Korea has moved from an agrarian subsistence-level country to a newly-industrialized society with a per-capita income of \$5,000. National income has doubled, in real terms, in just seven years. The country now has one of the largest economies in Asia. Much of that growth has been founded on manufactured exports, with most imported wood exported as finished goods and packaging. With rising incomes, South Koreans have begun enjoying amenities, including wood-based housing.

Demand and Timber Quality

The broad spectrum of Alaska's timber values is rivaled only by British Columbia's. Timber in Southeast

Alaska ranges from large, knot-free Sitka spruce (*Picea sitchensis* (Bong.) Carr.) whose premium logs are valued at several thousand dollars per thousand board feet; to construction-grade spruce and hemlock (*Tsuga heterophylla* (Raf.) Sarg.) trees of small size, many with internal decay. Within this range lie many marketing options and challenges, the latter because of competing sources abroad (Brooks 1989, Flora and others 1991 a and b, Flora and McGinnis 1989, Flora and Vlosky 1986). Because of opportunities to avoid defects and select product dimensions, sawmilling tends to raise the quality of products, giving additional meaning to the phrase "value-added". Thus a small tree with substantial taper, typical of southeast Alaska's northern reaches and upper elevations, may yield highly valuable tight-grained lumber. In this respect, Alaska's fine-grained smaller trees compete in Japan with Soviet logs; and because federal timber cannot be exported in round form, Soviet logs tend to displace Alaskan national-forest cants from small trees.

The majority of Alaska's timber exports, lumber and logs, are in the middle grades, termed "performance grades" here and elsewhere (Flora and McGinnis 1989, Haynes and Brooks 1990). Performance-grade logs are characterized by substantial length, small knots and little defect; they compete with number 2 sawlogs from the Pacific Northwest. Lumber from such logs, both spruce and hemlock, faces competing supplies from British Columbia and the Pacific Northwest. Nonetheless, because of its prominence in Alaska's inventory and the paucity of competition in this class outside North America, most of Alaska's 1990 log exports represented performance grades. Alaska's lumber exports were at this quality level or above.

MARKET DYNAMICS

This report is concerned primarily with Alaskan timber circumstances in FY 1990. However some supply and demand factors evolving in 1990 will bear heavily on Alaska's markets in the near future.

The prominence of Southeast Alaska's old-growth forests in the world timber economy was increased in 1990 by two circumstances elsewhere in North America. First, attempts by Federal agencies to develop strategies to ensure survival of the northern spotted owl are likely to restrict timber management activities within the old-growth forests of Oregon, Washington and California. In addition, replanning of private and public cutting are already underway in these areas. The Pacific Northwest Research Station has estimated that the replanning and the emphasis on owl protection are likely to result in a price increase of 137 percent for export logs in the short run. It was estimated that export softwood lumber prices would rise about 116 percent. The above figures assume an 18 percent harvest reduction in the Douglas-fir region of Washington and Oregon from replanning and a 35 percent harvest reduction directly related to owl habitat provisions.¹ (Flora and McGinnis, 1991).

The second matter, also bearing on old-growth timber, was British Columbia's late-1989 return to a strict interpretation of its long-standing prohibition of log exports. During weak markets of the 1980s, certain locales and species had been exempted from the embargo. By late 1990, log exports from British Columbia had fallen by more than half, with the remainder largely attributable to harvests arranged earlier but not yet completed.

A third event was a Congressional embargo on log exports from most States in the West. Excepted were Alaska and one-fourth of Washington's harvests from State-owned lands. Although it was not to take effect until the start of 1991, the embargo was widely anticipated, causing market impacts well in advance.

Anticipation of all three developments probably produced larger inventories of North American logs abroad, and higher prices, than would otherwise have occurred in 1989 and 1990. The Canadian decision, for instance, could reasonably have been expected to raise prices of Canadian export lumber in 1990. There was

also rapid growth in softwood lumber exports from the Northwest in 1986-90, based partly on growing Japanese reliance on cants from federal lands, the principal remaining source of old-growth timber. However sharp reductions in Canadian lumber exports to the United States, because of reduced housing demand, undoubtedly damped price movements. In any event, prices of Canadian lumber fell during 1990, prices of Pacific Northwest export lumber remained roughly constant, and Alaskan lumber followed the trajectory shown in Figure 8.

The possibility of a continuing world recession in demand for wood products has been raised by a number of analysts. 1989-90 has been widely seen as a cyclic peak in world wood-based construction activity. High interest rates in Japan, a lower-valued yen, and a trough in housing starts there may coincide to suppress demand for Alaska wood products of all kinds.

Meanwhile, competition from Soviet timber, mentioned earlier with respect to Japan, may be developing. During 1990, several U.S. firms were aggressively surveying timber prospects in the Soviet Far East and eastern Siberia, attempting to secure timber opportunities in especially favorable situations of timber quality and access, while dealing with profound uncertainties about regulatory and ownership circumstances, as well as the likelihood of competition from other countries aiming at developing Soviet resources. Several Pacific Rim countries tentatively plan wood-products investments in the Soviet Union.

U.S. involvement was complicated in 1990 by concerns about the possibility of introducing Soviet forest pests into North America, a matter that came under intensive inter-agency federal study. Whatever the outcome, increased shipments to the Pacific Rim of Soviet timber, whether as logs, lumber or plywood, would have some impact on markets for lower-grade timber everywhere, via a domino effect. Possible effects on prices and U.S. shipments are described elsewhere (Flora and others, 1991a).

Equally uncertain are the prospects for competition for Alaskan wood products from radiata pine (*Pinus*

1 In mid-1991 the USDI Fish and Wildlife Service expanded by three million acres the area of forest land viewed as habitat critical to maintenance of owl populations in the Pacific Northwest. A great deal of uncertainty persists as to the location and type of timber management activities to be permitted within designated habitat areas. As a result, the impacts of implementing owl strategies are speculative. In particular, the effect on the market for Alaskan wood products will depend on how such environmental actions are perceived internationally. The possibility of similar environmental actions in Alaska could reduce the State's appeal as a source of timber to replace that no longer available from the Pacific Northwest.

radiata) originating in Chile and New Zealand (Brooks 1989, Flora and others 1991a, Haynes and Brooks 1990). In Chile, harvests increased by half in the three years ending in 1988. Together, the two countries may double harvests in the decade after 1990 (Haynes and Brooks 1990). In the late 1980s, their joint harvest was about 23 million cubic meters annually, or about four billion board feet. A key question is whether pine lumber and logs, with the especially wide growth rings associated with fast growth, will compete in the same markets as Alaska's construction-grade timber. Meanwhile, Japan, Korea and China are significant importers of radiata pine.

During 1990, China increased significantly its capacity to import wood products. Although Alaska did not participate significantly in that market, U.S. softwood log shipments to China were at the annual rate of one-half billion board feet in the last quarter of FY 1990. This was about half the level of 1988, but almost twice the level of third-quarter 1989. China's foreign exchange was growing rapidly at the end of 1990, suggesting further improvement in markets there for basic construction materials. Developments in China may have been among the most dynamic market features of Pacific Rim softwood demand in 1990.

TIMBER AND THE ALASKAN ECONOMY

Employment in the Wood Products Industry

A relatively strong market for Alaskan wood products in FY 1990 resulted in record employment for the industry in Southeast Alaska (Table 6). Total industry employment was estimated to be 3543 jobs. Employment in both logging and sawmills increased in comparison to 1989, although at a slower rate than in previous years. Pulp mill employment declined slightly, dropping back down to the 1988 level.

Economists sometimes use a multiplier to help express the effect that a firm or industry has on the economic activity of a region. The actual size of the

multiplier varies depending upon the availability of the goods and services required by the industry to operate and the portion of the total payroll that is actually spent in the area. Multipliers for Southeast Alaska are smaller than those of metropolitan areas with greater industrial capacity and a larger resident labor force. Nevertheless, when the multiplier concept is applied, the total number of jobs related to timber harvesting is significantly more than the employment reported for the wood products industry alone. An estimated 2570 additional jobs are indirectly supported in other industries such as construction, towing, stevedoring and numerous retail and service outlets.

**Table 6. Employment in the Wood Products Industry of Southeast Alaska
Fiscal Years 1981-1990.**

EMPLOYMENT	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Logging	1047	991	1010	946	1004	1239	1545	1981	2113	2144
Sawmills	605	540	429	395	363	331	375	468	478	500
Pulpmills	1081	975	854	700	580	772	861	892	925	899
Total Direct Employment ^{1/}	2733	2506	2293	2041	1947	2342	2790	3341	3516	3543
Indirect and ^{2/} Induced Employment	2125	1950	1800	1600	1500	1825	1950	2350	2550	2570
TOTAL	4858	4456	4093	3641	3447	4167	4740	5691	6066	6113

1/ Source: Alaska Department of Labor and USDA-Forest Service, Alaska Region

2/ These estimates were generated with the computer simulation model IPASS, developed for the Forest Service to analyze the effects of agency management initiatives and investments on employment and earnings in Southeast Alaska. The distinction between direct and indirect employment is a function of the Standard Industrial Classification (SIC) system underlying the collection and grouping of the Federal economic statistics embedded in the model. In this context, the term "direct employment" refers to the number of jobs reported for each industry under its corresponding SIC code. The term "indirect employment" refers to the number of jobs reported under the SIC codes corresponding to the industries from which purchases are made throughout the production process. "Induced employment" refers to the additional number of jobs that are supported when the wages and salaries of these employees are spent locally. Direct employment provides the best indication of the growth of an individual industry while the sum of all three categories is a better indication of the significance of any one industry to the region's economy.

Private timberlands are not subject to the requirement for primary manufacture that restricts the export of most logs from the Tongass. Therefore, almost all of the private timber harvested moves directly into the international market for softwood logs. As a consequence, most of the 1399 jobs provided by the pulp mills and sawmills in Southeast Alaska are linked to timber supplies from the National Forest. Figure 10 shows that timber cut from lands open to log exporting generates about 3.5 jobs per million board feet harvested annually. This includes the indirect employment as described above. For timber cut on the Tongass, the number of jobs supported per million board feet of annual harvest is estimated at 8.7. The mandate for domestic processing generates 2-1/2 times as much employment per unit of wood in comparison to logs exported in the round.

As illustrated in Figure 11, logging employment is at a decade high but it is subject to wide fluctuations that are closely linked to changes in annual harvest volume. Over the last five years, the number of logging jobs has more than doubled with the resurgence of harvest on National Forest lands and the continued high level of harvest on timberlands owned by the Native corporations. It is not likely that employment will remain at this level because harvest on private timberlands is expected to decline considerably over the next few years (ADOL, "Alaska Economic Trends", June 1991). Because of the remote location of logging operations and the mobility of the work force, the secondary impacts of changes in logging employment are smaller in relation to other components of the wood products industry.

Figure 11.
Timber Harvest and Logging Employment
Southeast Alaska 1981-1990

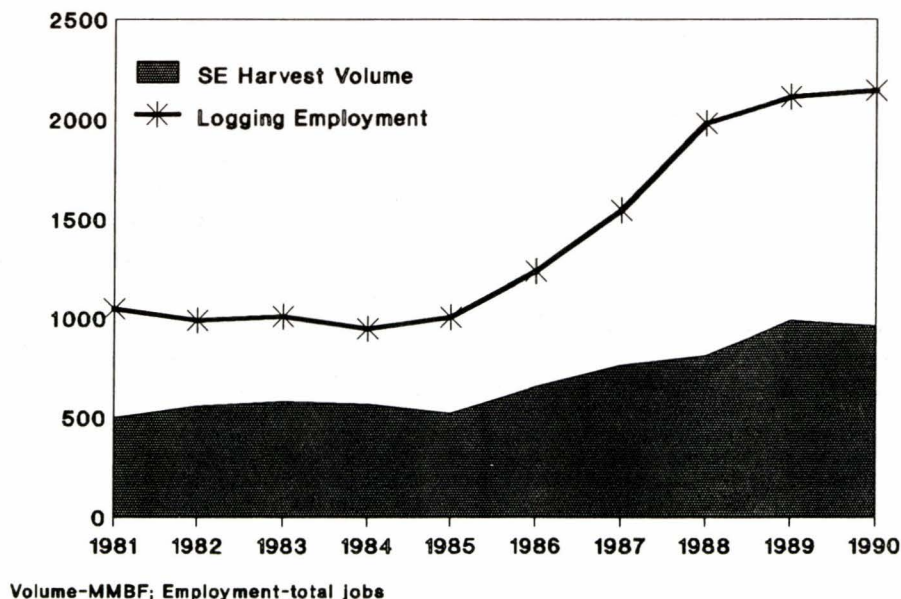
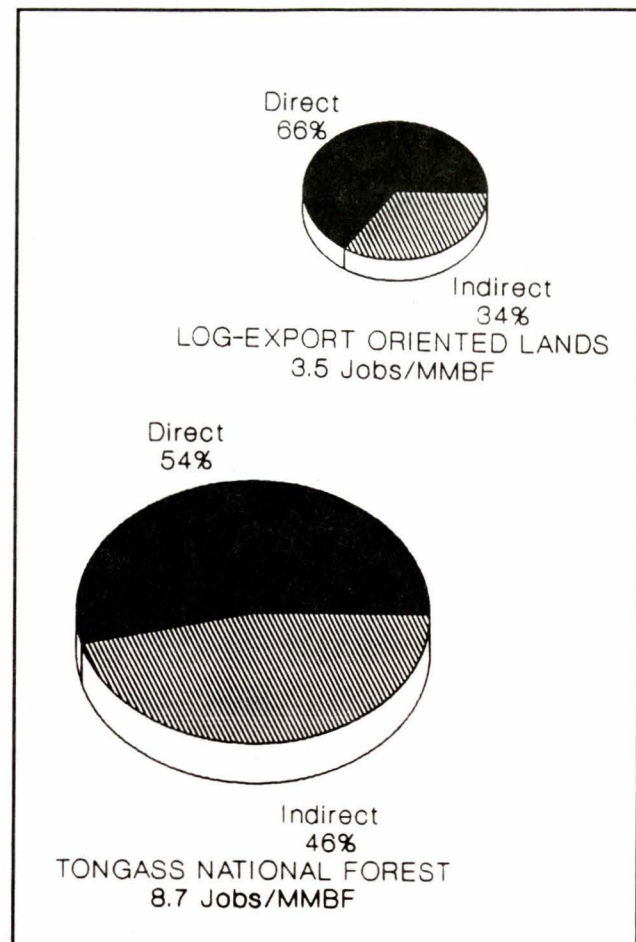


Figure 10.
Total Employment Estimates
National Forest vs Export-Oriented Harvest



Pulp Production in Alaska

Two pulp mills, one operated by Alaska Pulp Corporation in Sitka and the other by Ketchikan Pulp Company in Ketchikan, were built in the 1950's. Long-term timber sale contracts guaranteed a supply of raw materials and helped to attract new industry to Southeast Alaska. The effort was initiated by the Federal Government and the Territory of Alaska to promote greater economic stability in the region.

"During the 1940's the region's economic base was all but wiped out. Gold mining was terminated in 1942. After decades of serious over exploitation, the salmon resource crashed -- average annual salmon harvests declined from 31 million fish in 1945-49 to 19 million fish in 1950-1976 and bottomed out at 8 million fish for 1977-79.

The creation of the new forest products industry in 1954, therefore, was something of a rescue mission for the region's economy. The provisions of the fifty year contracts guaranteeing timber supply were essential to induce the substantial private investment required. The initial investment was over one hundred million dollars and further substantial investments were made for increasing capacity and modifying the processes. This made it the largest private investment in Alaska since the Morgan-Guggenheim investment in copper and a railroad in the first decade of the century. (Rogers, 1989)"

The two firms continue to dominate the wood processing endeavors of Southeast Alaska and have employed a number of techniques to survive the economic fluctuations of the 1980's.

The same characteristics that provide for stable employment make it difficult for the pulp mills to be responsive to market shifts. The extensive capital invest-

ment represents a fixed cost that cannot be altered in the short-term. Also, the nature of production is such that it cannot be adjusted incrementally; the plant must be run continuously or shutdown. The shutdown of either of the mills would have significant impacts on the communities in which they are located. The Ketchikan Pulp Company is ranked as the number ten firm in the State with regard to the number of people employed, and Alaska Pulp Corporation ranks twenty-second. Both are the single largest employers in their respective communities. Some flexibility is achieved by directing more logs to lumber production when the return on processing will be higher. The automated mill constructed at Ward Cove for KPC is illustrative of this symbiotic relationship; Wrangell Forest Products serves the same function for APC.

The pulp mills in Alaska were originally designed to produce high grade dissolving pulp, although they can produce paper grade pulp if market conditions warrant. Given the higher prices that dissolving grade pulp has traditionally commanded, and the availability of raw material which is suited to the production of dissolving pulp, there has been limited production of paper grade pulp to date.

In the world market, the Alaskan mills are at a competitive disadvantage for a number of reasons. Profit margins are reduced by the high costs of harvesting Alaskan timber. When viewed from a global perspective, United States regulations for environmental protection further increase operating costs. Finally, lawsuits threaten the continued availability of an adequate timber supply to maintain a consistent level of pulp production. The plans covering the current operating periods for both the APC and KPC contracts have been in litigation since they were approved by the Forest Service. Harvesting of a portion of the volume has been blocked by court order at various times in the lawsuits. Continued uncertainty as to the availability of raw materials may erode the confidence of world trade partners in the reliability of the Alaskan pulp supply.

FINANCIAL ANALYSIS OF THE TONGASS TIMBER SALE PROGRAM AND THE ECONOMIC IMPACTS OF THE TIMBER SALE PROGRAM ON SOUTHEAST ALASKA

Harvest and processing of timber from the Tongass National Forest provides employment in Southeast Alaska. Revenues from the Tongass timber sale program are shared by the federal government and the State of Alaska. The State of Alaska uses these shared revenues for schools and roads.

The Tongass Timber program is part of a long-term cooperative effort among the federal government, the State of Alaska and local government to provide greater economic diversity in Southeast Alaska and more year-long employment. The Forest Service established requirements to process National Forest timber in Alaska, including the construction and operation of pulp mills via long-term, 50-year timber sale contracts. Maintaining timber supply opportunities for the Southeast Alaska timber industry was a major objective of the Tongass Land Management Plan and the Alaska National Interest Lands Conservation Act. To a large extent the employment objective was met again in fiscal year 1990 -- logging, sawmill, and pulpmill employment in Southeast Alaska is now 30 percent greater than it was in fiscal year 1981 (Table 3).

Clearly, a constant supply of Tongass timber alone cannot assure the maintenance of ANILCA's timber employment objectives. Other controlling factors include exchange rates, the overall Pacific Rim demand for wood fiber and the competitiveness of timber suppliers outside the Tongass National Forest. But, it is certain that with an internationally competitive United States dollar and stable domestic economic growth, the demand for timber from the Tongass National Forest and other ownerships in Southeast Alaska has increased over the past three fiscal years. It is equally clear that Alaskan producers of wood products can survive, prosper and create new jobs in a positive macroeconomic environment which promotes exports from the United States. The Alaska Department of Labor has noted the success of Alaska's manufacturing sectors, and especially the wood products industry, to continue competing abroad and expanding employment.

"During the good market years of 1986 and 1987, the timber industry posted double digit percentage employment gains. This is strong growth under any circumstances, but especially considering the poor performance of the economy as a whole. In 1986, seafood processing was the only other industry to register any employment gains. Out-

side of the manufacturing sector, no other major industry groupings posted employment gains during 1986 or 1987. Without the strength of the manufacturing industry, the state's most recent recession would have been even worse."(Rae, 1988)

Timber Sale Program Information Reporting System

TSPIRS, which stands for Timber Sale Program Information Reporting System, is an information system developed by the Forest Service for evaluating the performance of timber sale programs on individual National Forests. Congress directed the Forest Service to develop and implement a timber sale cost accounting system. This request was in response to concerns about the efficiency of timber sale programs on the National Forests, especially those sale programs where costs were believed to exceed revenues. These are commonly called below-cost timber sale programs. At Congressional request, the Forest Service developed TSPIRS cooperatively with the General Accounting Office (GAO).

Presented in this section are the *Statement of Revenues and Expenses, Economic Account and Employment, Income, and Program Level Account* from TSPIRS for FY 1990 for the Tongass National Forest. A number of technical reports are available to Congress and the public which describe TSPIRS (GAO 1986, GAO 1987, USDA Forest Service 1987). Provided below is a brief description of how the findings in TSPIRS are calculated and what the numbers mean. This description of TSPIRS is adapted in part from Schuster and Jones, 1989.

How the TSPIRS numbers are calculated.

The Statement of Revenues and Expenses, is an annual financial statement. It matches timber-related costs against the revenues received from the timber harvested on the Tongass in fiscal year 1990. The cost of current and previous investments are included. The calculation of revenues and costs are based on "generally accepted accounting principles" for government as established by GAO. Revenues include cash and assets received from timber sale activities on the Tongass, including stumpage receipts, purchaser road credits established and associated charges such as deposits for brush disposal. Costs for the sale of timber on the Tongass are reported in two broad categories, payments to states and

controllable expenses associated with timber harvesting. Controllable expenses include annual costs such as sale administration, general administration and depreciation on agency-funded facilities. Also counted as controllable expenses are allowances from two cost pools.

GAO defines cost pools as deferred-cost asset accounts. One pool accounts for long-term timber development or investment costs (the growth activity pool) and the other deals with short-term or temporary sale operation costs (the sale activity pool). Each pool consists of costs in specified categories accumulated over several years, including fiscal year 1990. Costs are not discounted but enter the pool at current value. The sale activity pool includes multi-year costs attributable to specific timber sales, for example, timber sale preparation. The growth activity pool includes costs which cannot be assigned to an individual timber sale but serve the whole timber sale program or support timber sales in a region or complete drainage. Arterial or main-line roads are a good example of a cost item serving a number of timber sales over many years, and therefore, an item entered as a cost in the growth activity pool.

A percentage of each cost pool was counted as an expense in fiscal year 1990. For example, the percentage of the sale activity pool charged as a current expense is based on the ratio of volume harvested to the sum of volume under contract plus volume harvested. In sum, the Statement of Revenues and Expenses shows that the Tongass experienced a net gain of \$2.8 million on its timber sale program in fiscal year 1990.

The Economic Account, displays current and future long-term benefits and costs from the acres receiving timber treatments in fiscal year 1990. Unlike the single-year time frame of the Statement of Revenues and Expenses, the Economic Account has an infinitely long time horizon. Future costs and benefits are discounted to fiscal year 1990.

The purpose of the Economic Account is to display the net present value of the acres affected by timber harvest in fiscal year 1990. Net means positive or negative. Present is defined as discounted costs or benefits. And finally, value refers to the monetized worth of the

output produced through the timber sale program. Desirable outputs such as increased hunter-days are considered positive effects while undesirable outputs such as increased sedimentation are assessed as negative effects.

The money spent to establish a new stand of trees is counted as a cost today. Future returns to the government of selling the timber and costs of management are discounted. This is to say the future dollars are compared with dollars invested today which would earn a four percent return on investment after inflation. For example, if an investment yields an eight percent annual return but inflation averages four percent, then the investment, in fact yields a four percent return net of inflation.

The TSPIRS Economic Account for the Tongass National Forest finds that the program of forest management established for the acres harvested in fiscal year 1990 will yield a positive present net value of \$19.6 million.

The Employment, Income, and Program Level Account supplements the findings displayed in the Statement of Revenues and Expenses, and the Economic Account with information such as the local economic impacts of the timber sale program. Also reported are general data on the timber sale program such as volume and acres harvested, acres of young stands receiving silvicultural treatments and a display of the miles of road built to support the timber sale effort.

Impacts of the timber sale program on the local economy are estimated using an economic model of Southeast Alaska (McHugh et.al. 1989). Reported are the economic impacts of the harvest and processing of timber from the Tongass National Forest in fiscal year 1990. The employment levels supported by the timber sale program are reported in full-time equivalents. For example, one full-time equivalent in logging may actually represent two timber-felling jobs where each employee is working only six months per calendar year due to weather conditions in Alaska.

TABLE 7. Revenues and Expenses Tongass National Forest Fiscal Years 1989 and 1990		
	FY 1989	FY 1990
1. <u>REVENUES</u>		
Timber Sales	3,573,281	16,105,341
Purchaser Road Credit	17,194,336	20,175,165
Associated Charges	270,954	236,225
Interest and Penalties	72,885	113,242
TOTAL REVENUES	21,111,456	36,624,973
2. <u>EXPENSES</u>		
Sale Administration	3,192,144	5,081,695
Sale Activity Allowance	4,916,827	9,014,615
Growth Activity Allowance	3,044,602	5,321,195
Facilities Depreciation	538,974	538,974
General Administration	3,200,577	4,964,118
TOTAL OPERATING EXPENSES	14,893,123	24,920,080
Gain/[Loss] Before Payments to State	6,218,332	11,709,892
3. <u>PAYMENT TO STATE</u>	4,989,178	8,888,674
Net Gain/[Loss] From Timber Sales	1,229,154	2,821,218
4. <u>VOLUME HARVESTED</u> (Board Feet)	444,606,000	471,634,000

TABLE 8. Present Value of Investments and Future Benefits Tongass National Forest Fiscal Years 1989 and 1990		
	FY 1989	FY 1990
1. <u>PRESENT VALUE BENEFITS</u>		
Timber	25,972,319	38,213,887
Recreation	0	94,838
Wildlife	26,685	456,453
Fisheries	3,912,963	2,100,866
TOTAL PRESENT BENEFITS	29,911,967	40,866,044
2. <u>NEGATIVE EFFECTS</u>		
Wildlife	611,801	790,356
3. <u>VALUE OF INVESTMENTS</u>		
Timber	18,200,561	19,745,018
Roads	46,775	16,628
Recreation	0	10,405
Wildlife	0	2,003
Fisheries	821,968	659,387
TOTAL INVESTMENTS	19,069,304	20,433,441
4. <u>PRESENT NET VALUE</u>	10,230,862	19,642,247

**TABLE 9. Employment, Income, and Physical Accomplishments
Tongass National Forest
Fiscal Years 1989 and 1990**

	FY 1989	FY 1990
1. <u>EMPLOYMENT</u>		
Direct Jobs	2,083	2,214
Indirect and Induced Jobs	1,776	1,881
Total Jobs	3,859	4,095
2. <u>LOCAL FISCAL EFFECTS</u>		
Total Personal Income	128,505,000	136,364,000
Federal Income Tax Generated	24,416,000	25,909,000
Cumulative Value to Local Communities	530,000,000	562,450,000
25% Fund Payment to State	4,989,178	8,888,674
3. <u>TIMBER PROGRAM ACCOMPLISHMENTS</u>		
Volume Offered - Net Sawlog	320,000,000	334,300,000
Volume Sold - Net Sawlog	252,000,000	286,513,000
Volume Harvested - Net Sawlog	377,000,000	399,000,000
- Utility and Firewood	68,000,000	73,000,000
Total Harvest Volume	445,000,000	472,000,000
Regeneration Treatment (Acres)	7,908	8,128
Timber Stand Improvement (Acres)	2,414	2,792
Total Acres Harvested	13,470	14,234
4. <u>ROADS CONSTRUCTED IN SUPPORT OF TIMBER PROGRAM</u>		
Appropriated	8	32
Purchaser Credit	149	123
Total Road Miles	157	155